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(19) AUSTRALIAN PATENT OFFICE

(54) Title
LOAD BEARING FIBRE CEMENT PANEL

International Patent Classification(s)
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(30) Priority Data

(31) Number (32) Date (33) Country
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(71) Applicant(s)
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(72) Inventor(s)
GRAEME JOHN TILLY

(57)

This invention involves the creation of a load-bearing wall panel consisting of face sheets of compressed fibre cement, as produced by Hardies, on each side of a core of polystyrene foam. The resultant panel has been used in the past as non-load-bearing panels in framed structures. The face panels have sufficient load bearing capacity for a single storey building, but will fail in buckling unless they are adequately supported by webs to accept the shear stresses imposed if the panel has a bending load. The foam core is unreliable in this regard.

The inventive step in making these panels load-bearing is in glueing vertical webs of fibre cement or other material such as timber or steel rectangular hollow sections to assist the foam in accepting the shear load and to assist the face panels in accepting the local lintel loads at the ends of the panels. For small panels, the vertical webs need only be at the ends where they also encapsulate the foam thereby giving the panel a fire rating. Large panels may need additional vertical webs spaced along their length.

Claim

a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has end, and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.

AUSTRALIA

Patents Act 1990

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: LOAD BEARING FIBRE CEMENT PANEL

The following statement is a full description of this invention, including the best method of performing it known to me:-

This invention involves the creation of a load-bearing wall panel consisting of face sheets of compressed fibre cement, as produced by Hardies, on each side of a core of polystyrene foam. The resultant panel has been used in the past as non-load-bearing panels in framed structures. The face panels have sufficient load bearing capacity for a single storey building, but will fail in buckling unless they are adequately supported by webs to accept the shear stresses imposed if the panel has a bending load. The foam core is unreliable in this regard.

The inventive step in making these panels load-bearing is in glueing vertical webs of fibre cement or other material such as timber or steel rectangular hollow sections to assist the foam in accepting the shear load and to assist the face panels in accepting the local lintel loads at the ends of the panels.

For small panels, the vertical webs need only be at the ends where they also encapsulate the foam thereby giving the panel a fire rating. Large panels may need additional vertical webs spaced along their length.

The thickness of the vertical webs can be chosen to accept whatever lintel load is required to suit the type of building on which the panels are to be used.

The top and bottom edges of the panels can be covered by strips of fibre cement to assist in distributing local loads into the face panels and to complete the 25 encapsulation of the foam core.

The panels can be tied into the floor slab or bolted to a supporting frame by drilling holes near the top and bottom edges.

The panels can be fitted with vertical rods during fabrication with anchor plates set into the bottom cover strip. The top extremity of these rods can be used 25 to bolt down roof members, or, if the panels are required to accept high wind or seismic loads, they can be post tensioned to ensure that the face panels do not come under tensile stress.

The structure of the load bearing sandwich fibre cement panel can best be understood by reference to FIGS. 1, 2 and 3.

30 FIG. 1. is a sectional view in which:-

- 1) is polystyrene core
- 2) is compressed fibre cement face panel
- 3) are the end fibre cement shear strips
- 4) is an intermediate vertical web
- 5) are the vertical lifting rods.

35 FIG. 2 is an isometric view of a typical panel showing how the foam is encapsulated by the end strips (3) and the top and bottom covering strips (8), which complete the encapsulation of the foam core and which help distribute the loads from the wall plate into the face panels.

40 FIG. 4 is an isometric view of an alternative embodiment of the panel, in which load-bearing capacity is increased by the use of square hollow steel sections (9). These have the added advantage that lintels (ii) can be directly bolted to them and they transfer the loads therefrom direct to the base of the structure. In this view the top and bottom sheets (8) are shown dotted to reveal the internal structure of the panel. (10) is a typical anchor plate into 45 which the lifting rod (6) is threaded.

FIG. 3 is a section YY showing the foam core (1), a typical anchore bolt (5), a lifting/post tensioning rod (6) and a lifting eye (7).

FIG. 5 is a section showing how sheets of fibre cement can be glued together to allow load bearing panels of any size to be made.

50 *The claims defining the invention are as follows:- a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has ends and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.

b) A load bearing panel as in (a) above, in which the end and, where used,

55 55 the intermediate structural webs are made of fibre cement.

c) A load bearing panel as in (a) and (b) above, in which the end, and where used, the intermediate structural webs are made of timber or hollow steel structural sections to which lintels can be bolted.

d) A load bearing panel as in (a), (b) or (c) above, in which the top and

60 bottom edges are faced with a structural section such as fibre cement, timber, steel or aluminium, to complete the encapsulation of the lightweight core material so it can be fire rated.

e) A load bearing panel as in (a), (b), (c) or (d) above, in which the face sheets are spliced together to allow the panels to be wider than the width

65 of the largest commercially available sheets of fibre cement.

f) A load bearing panel as in (a) to (e) above, in which the core is a layer of polystyrene foam or polystyrene beads in a cement matrix or is a lightweight foam concrete.

GRAEME JOHN TILLY

(Name of Applicant)
(BLOCK LETTERS)

30-4-92

(Date)

* Note: If there is insufficient space above to type the statement of claim, do not use this sheet, but use separate sheets of paper beginning with the words "The claims defining the invention are as follows:" and ending with the date and the name of the applicant in block letters.

15903/92

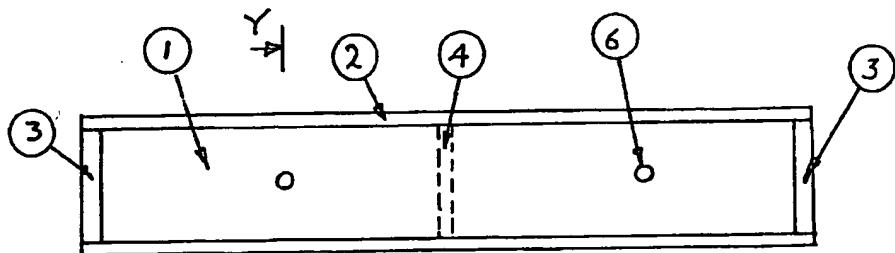


Fig 1

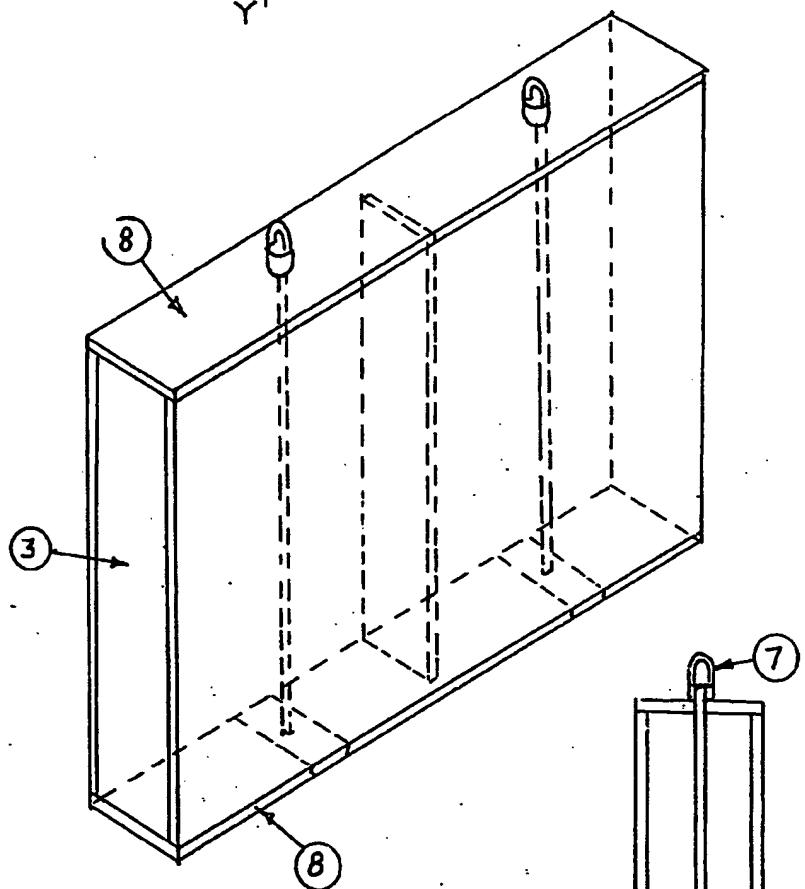


FIG 2

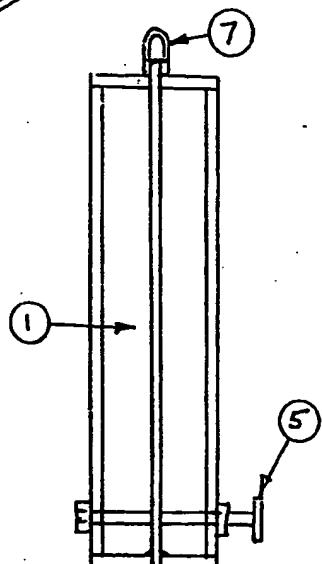


FIG 3

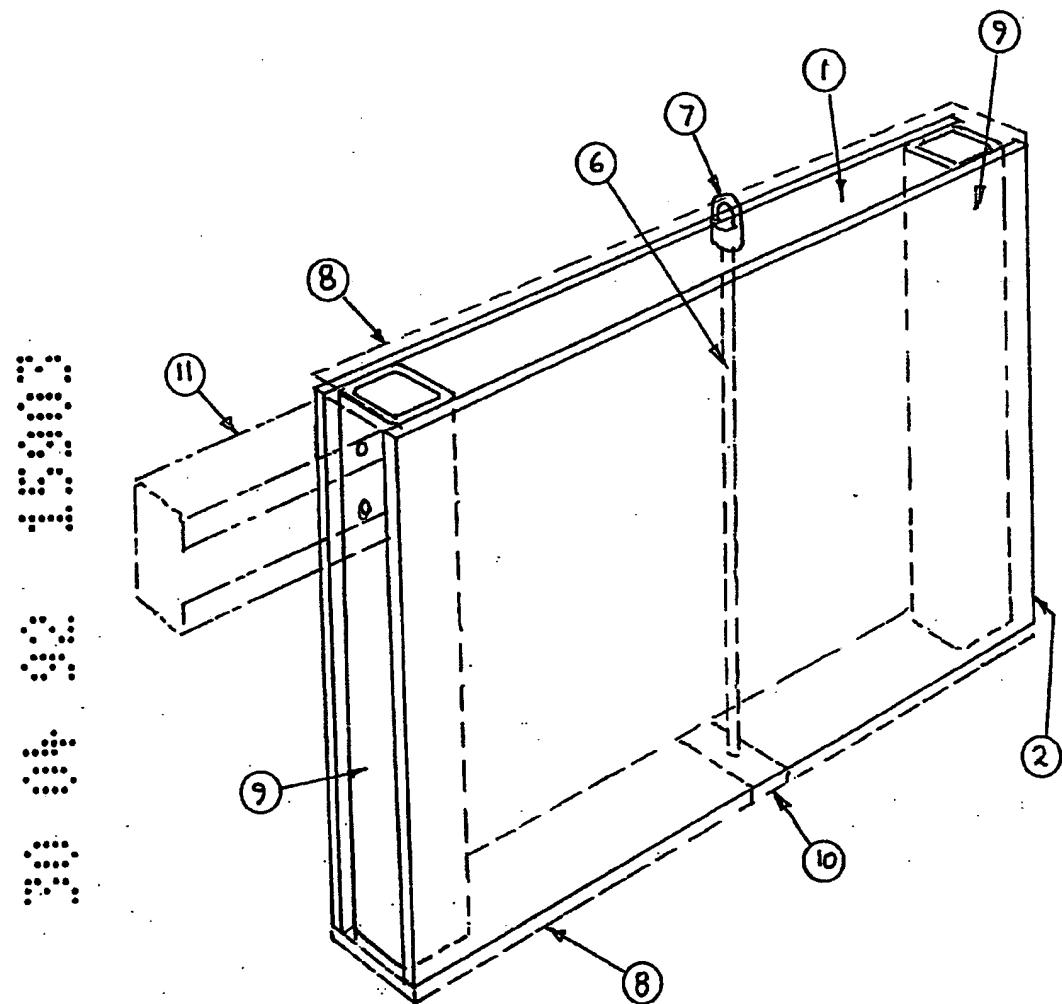


FIG. 4



FIG 5

ABSTRACT

This patent application reveals a load bearing wall panel which depends for its structural adequacy on the compressive strength of fibre cement sheets which form the outer skins of a sandwich panel. The core of the panel is any suitable lightweight material. Structural ribs of steel, timber or fibre cement sheet are used to enhance the load bearing capacity primarily by preventing the fibre cement sheets from buckling. They also encapsulate the lightweight core material to give the panel a good fire rating.

The claims defining the invention are as follows:-

- a) A load bearing sandwich panel consisting of fibre cement sheets on each face of a light weight core material which has end, and if necessary, intermediate structural webs which help to accept loads and which increase the buckling strength of the face sheets.
- b) A load bearing panel, as in (a) above, in which the end and, where used, the intermediate structural webs are made of fibre cement.
- c) A load bearing panel, as in (a) and (b) above, in which the end, and where used, the intermediate structural webs are made of timber or hollow steel structural sections to which lintels can be bolted.
- d) A load bearing panel as in (a), (b) or (c) above, in which the top and bottom edges are faced with a structural section such as fibre cement, timber, steel or aluminium, to complete the encapsulation of the lightweight core material so it can be fire rated.
- e) A load bearing panel as in (a), (b), (c) or (d) above, in which the face sheets are spliced together to allow the panels to be wider than the width of the largest commercially available sheets of fibre cement.
- f) A load bearing panel as in (a) to (e) above, in which the core is a layer of polystyrene foam or polystyrene beads in a cement matrix or is a lightweight foam concrete.

**(12) PATENT APPLICATION
(19) AUSTRALIAN PATENT OFFICE**

(11) Application No. AU 199215903 A1

(54) Title
Load bearing fibre cement panel

(51) International Patent Classification(s)
E04B 002/04 E04B 002/58
E04B 002/56

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(71) **Applicant(s)**
Graeme John Tilly

(54) Inventor(s)
Graeme John Tilly

PATENT REQUEST: STANDARD PATENT / PATENT OF ADDITION

I / We, being the person(s) identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

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[70] Nominated Person GRAEME JOHN TILLY

Address AS ABOVE

[54] Invention Title LOAD BEARING FIBRE CEMENT PANEL

[72] Name(s) of actual inventor(s) GRAEME JOHN TILLY

[74] Address for service in Australia 32 HAYES TERRACE, MOSMAN PARK, WA 6012

Attorney Code _____

ASSOCIATED PROVISIONAL APPLICATION(S) DETAILS

[60] Application Number(s) and Date(s) PK 5337 27.3.91

BASIC CONVENTION APPLICATION(S) DETAILS

| [31] Application Number | [33] Country | Country Code | [32] Date of Application |
|-------------------------|--------------|--------------|--------------------------|
| | | | |
| | | | |

DIVISIONAL APPLICATION DETAILS

[62] Original application number PK 5337

PARENT INVENTION DETAILS (Patent of Addition requests only)

[61] Application number _____ Patent number _____

TICK IF APPLICABLE

I am an eligible person described in Sections 33 - 36 of the Act.

Drawing number recommended to accompany the abstract FIG. 4


(Signature)

30 - 4 - 92.

(Date)

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

(* Delete if inapplicable)

In support of the Application made by GRAEME JOHN TILLY
of 32 HAYES TERRACE, MOSMAN PARK, WA 6012

for a patent for an invention entitled .. LOAD BEARING FIBRE CEMENT PANELS

I, GRAEME JOHN TILLY
of 32 HAYES TERRACE, MOSMAN PARK, WA 6012

do solemnly and sincerely declare as follows:-

*1. I am the applicant for the patent.

(or, in the case of an application by a body corporate)

*1. I am authorised by N/A
the applicant for the patent to make this declaration on its behalf.

*2. I am the actual inventor of the invention.

(or, where a person other than the inventor is the applicant)

*2. N/A

of is the actual inventor of the invention and

the facts upon which * I am/* the is entitled to make the
application are as follows:-

Declared at PERTH this 30TH day of APRIL 1992.


(Signature)

To: THE COMMISSIONER OF PATENTS